The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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War and the Business Man

WE are a united nation with one purpose only—the removal from the world of the curse of Hitlerism. No other consideration counts for anything whatever, and we all feel the inspiration of a supreme purpose and rejoice in the certain knowledge of its ultimate achievement. We rub shoulders at almost every street corner with brothers in belief and comrades in arms who have travelled many thousands of miles to take a hand in this grim and glorious task. We encourage one another by reciting the part played by each, and refresh our spirits in the contemplation of sacrifice suffered and valour displayed by all.

Sacrifice is an uneven affair; some can make more than others and those best able to suffer, do not expect, or indeed desire, to have their virtues displayed in print or blazoned on the wireless in the way appropriate to weaker members to whom these methods have been applied with such conspicuous success. It is not, however, inappropriate that the Trade Press should indulge in an occasional recital of the part played in all this victory—for victory it is from the start—by the business man. In the limited time at its disposal the wireless, after giving the news of our fighters, is so full of the doings of the politicians, the bureaucrats and the workers as to have no room for any news of the one class upon which all the others depend. We are not here concerned with the actual fighting, but only with the production of munitions and supplies, the maintenance of the economic life of the nation and the continuance of import and export trade.

In the matter of munitions, typical of all these other things, the start was slow and inadequate. We of THE CHEMICAL AGE are particularly well placed to know how slow and why. We search our records in vain for a case of a manufacturer or merchant who failed to do everything that could be done. Such orders as could be extracted from a swollen, dilatory and theory-ridden bureaucracy were executed with all the expedition possible in the circumstances. The difficulties were enhanced by the rapid multiplication of departments, divided into numberless divisions, and often more interested in evacuating themselves to provincial hotels and country mansions than in the practical side of the work which they seem to exist to hinder.

Equally serious in the early stages was the attitude of Labour, dictated by some of the men who have since joined the Government and revised their views. When the censorship is removed and the full tale of Labour's reluctance can be unfolded, the patriotism of the business classes will be more thoroughly appreciated. It is already perfectly clear that those early delays, which cost us so dearly, were the direct result of undue reliance upon bureaucrats and politicians who, in the very nature of things, exist to delay and hinder the processes of industry.

A word of encouragement to the business classes is more than overdue. A few here and there may be making money, bureaucratic complications give chances to the skilful profiteer that he would never have in an open market, but the great majority of business men are working themselves to the bone, doing their full share in the national effort, while facing certain penury if not indeed worse than that. There are no less than six hundred thousand persons described in the last census as employers of labour. These are the economic life-blood of the liberty for which we are fighting. They and their forebears are alone responsible for the supremacy in wealth on which our whole position depends. It is to them and to them only that we must look for our material well-being in the future. We are not fighting this war in order to set up a British variety of the corporate state or a new brand of national socialism, but some at least of those in high places fail to appreciate that fact. The business man can be relied upon to put his patriotism before his political and economic ideas and in that way displays a finer feeling than some of his opponents. There must, however, come a time, quite soon, when either his opponents will cease to use the war as a cover for their own designs, or the national unity will be put into jeopardy.

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NOTES AND COMMENTS

The Trade Press in War Time

IN his speech to the shareholders at the annual general meeting of Benn Brothers Limited, proprietors of THE CHEMICAL AGE (reported elsewhere in these columns), the deputy chairman, Mr. Gordon Robbins, laid some stress on the importance of the contribution made by trade journals to the war effort. The policy of the Board of Benn Brothers, loyally carried out by the staff, has been to maintain the quality of the editorial contents of the journals. One of their new tasks has been to give news of Government orders, themselves far too voluminous and meticulous to be made easily available—or, for that matter, intelligible—through any other medium. Another mission, equally important, is to focus opinion on Government disorders, which might never be exposed or corrected but for the safety-valve afforded by the responsible orders of the trade press carefully guided by expert opinion. To do them justice, the Government departments bear no malice against the trade press for their criticism, and the importance of maintaining the standard of the trade journals in war time was insisted on recently by an official of the Ministry of Information. It is all the more unaccountable, therefore, that the Chancellor of the Exchequer should have seen fit to include trade journals among the articles that are not to be exempted from the new Purchase Tax, as Mr. Robbins caustically pointed out.

Purchase Tax Exemption ?

SINCE the above was written, news has come to hand that some Members of Parliament are fully aware of the war-time importance of trade journals, even if the Chancellor of the Exchequer classes them with cosmetics and other similar commodities. Following a private meeting held on Tuesday at the House of Commons, a number of M.P.'s tabled amendments proposing the omission from the Purchase Tax Schedule of the Finance Bill of various categories of printed matter. Mr. Kenneth Lindsay's amendment covered "printed books, printed music, and printed pamphlets and leaflets," Mr. Mander and others dealt with newspapers, while Mr. P. J. Loftus tabled another amendment to exempt from the tax the following classes of periodicals: (1) Weekly reviews, which during the first six months of 1940 were published without illustrations and retailed at a price of not less than 6d.; (2) weekly technical, scientific and trade journals, which during the first six months of 1940 were retailed at not less than 6d. and which are certified by the Board of Trade as desirable to encourage in national interests; and (3) all monthly and quarterly scientific, technical, trade, art, political, and social reviews, whether illustrated or not, which during the first six months of 1940 were retailed at a price of not less than 1s.

Kaffer-Wag-'n-Bietjie

AN interesting short paper presented to the Chemical Metallurgical and Mining Society of South Africa by Dr. P. E. Hall, on certain South African woods as sources of producer-gas generator fuels, led to an interesting discussion revealing unexpected possibilities from distinctly unpromising materials. Dr. Hall restricted himself to an analysis of woods of species of *Eucalyptus, Acacia,* and *Pinus,* with special consideration of their specific gravity, ash content, charcoal yield, and tar yield. His analysis is the first serious examination of South African timber resources for fuel purposes and, in the very nature of things, was simply an incomplete preliminary survey. Professor F. J. Tromp, who opened the ensuing discussion, concentrated on the question of charcoal, and made some valuable observations from his experience of the Bush Veld. He had found that the Vaal Bush gave a flame matching the best coal fire and would burn to a perfect white ash. The Vaal Bush, known in Afrikaans as *Blinkblaar-wag-'n-bietjie* and *Kaffer-wag-'n-bietjie,* and alternatively in English as the Wait-a-bit Thorn, has so far been notorious rather as an obstacle than as a producer of the raw material of industry. Judging from its method of burning, it should produce a dense and not very friable charcoal, of high value for portable producers.

Unemployment for Stirrup-Pumps ?

CHEMISTRY, which is already playing an impressive part in the national effort, has expanded its scope of assistance in solving the problems of A.R.P. Its latest reported triumph is the production of a powder from materials readily available in this country, which, it is claimed, will extinguish incendiary bombs within a couple of minutes. Such an achievement will be warmly welcomed by thousands of householders, but it may be regarded with mixed feelings by the countless stirrup-pump squads up and down the country who, naturally enough, will dislike being rendered obsolete! The discovery of the powder, according to a report printed in *The Times* on Wednesday from their Birmingham correspondent, has been made by Mr. J. A. Eversden, a Birmingham man connected with the steel industry, and a test has been made of the powder's efficacy before an official of the Home Office. An incendiary bomb was smothered with the powder after it had been burning for 90 sec., and was extinguished in another 60 sec. It will be observed that this preparation does not act noticeably faster than the measures in current use. However, it does seem to offer advantages in an emergency where pipe water supplies are cut off or sufficient quantities of sand are not available.

An Old German Legend

AMONG lay-folk the legend of the superior ingenuity of the Germans in scientific industry dies hard; even nowadays, when it is universally acknowledged that most of the best scientific brains have been driven from the Reich by racial or political ostracism. We were, therefore, all the more pleased to read a letter in *The New Statesman* recently from Mr. Geoffrey Marchand, Director of the Glass Manufacturers' Federation, correcting an impression of this kind that had been conveyed by an article on glass as an *ersatz* commodity in Germany. We have read the said article and are quite convinced, like Mr. Marchand, that there was no intention to boost German ingenuity or enterprise; but the implication was there that it needed *German* genius, prompted by war-time necessity, to fabricate certain implements out of glass. The article cited, among other commonplaces, " a new kind of fire-proof glass called Jena glass " as something outstanding in the way of technical achievement. Readers of THE CHEMICAL AGE need hardly be reminded of the quality of the British laboratory glassware industry, which has reached a really high standard in the face of every official discouragement, and has produced materials that can rival both the Jena glass and all other German subsidised products in every way. Nevertheless, we do not apologise for our insistence; the public must be reminded that the British scientific worker can hold his own against the German in the workshop just as well as can the British airman in the skies.

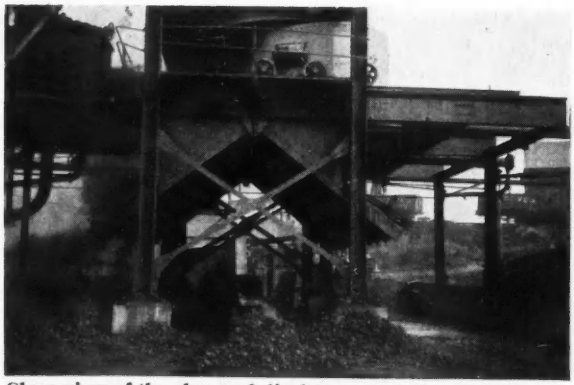
DOMESTIC CHARCOAL PRODUCTION

A New Wood Distillation Retort

FROM A SPECIAL CORRESPONDENT

THE demand for charcoal has markedly increased since the outbreak of war. It is used in the metallurgical industries for the refining of many metals, including silver, brass and copper; for the manufacture of carbon disulphide; for case-hardening; for lightening soil in horticulture; for animal and poultry foods; for decolorising; for absorption of gases, *e.g.*, in gas masks; as heat insulation; and for other purposes for the most part directly or indirectly connected with the war. With the additional demand created by the placing of industry on a war basis there has come a stoppage of supplies from the usual sources. Some figures (given to the nearest ton) for two pre-war years show to what extent we are now dependent upon our war efforts for the supply of charcoal:—

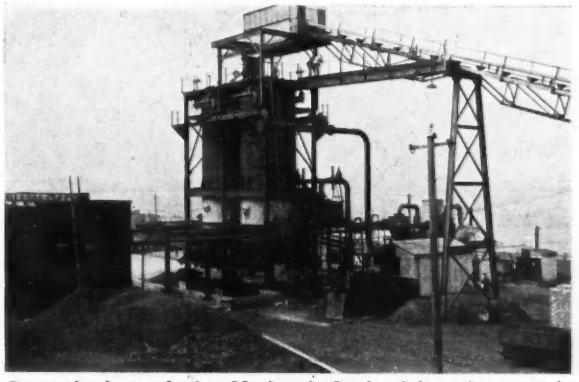
	1936 Tons	1937 Tons
DECOLORISING AND ACTIVATED CARBONS:		
Animal charcoal imports	166	70
Other charcoals from:—		
Germany	77	221
Netherlands	537	453
France	69	238
Other foreign countries	29	24
	878	1006
CHARCOAL FOR OTHER PURPOSES:		
From:—		
Ceylon and dependencies	126	373
Other British countries	34	129
Sweden	53	75
Poland	51	60
Germany	249	295
Netherlands	9	22
Java	—	155
Belgium	17	15
Other foreign countries	115	151
	654	1275



Close view of the charcoal discharge and charcoal floor at the Midland works of the National Carbonising Company.

In addition to these quantities then imported, Ceylon sent us coconut charcoal to the extent of 7448 tons in 1936, and 4077 tons in 1937. It is not difficult to deduct from this list the countries now closed to us for charcoal supplies by the war, and to visualise how great proportionately must be our own effort for home production. Fortunately for any steps that are being taken to safeguard our position, satisfactory processes are available for treating waste woods that may be produced as by-products from other wood-using industries.

Charcoal can be made by the ancient method of the charcoal burner which has persisted almost unchanged since the dawn of history. This method is as wasteful as is the meiler heap for the production of coke, but just as the old meiler



General view of the National Carbonising Company's charcoal plant, showing the retorts.

heap is still used for coke production in certain parts of India, so the method of the charcoal burner is used in the wilder parts of Europe. Charcoal kilns have been in use in Europe and in this country for many years now and have the advantage that by-products of considerable value are recovered. With the synthetic production of acetic acid, acetone, and many other organic products which can be derived from wood, the relative value of these by-products has probably diminished.

It is claimed in some quarters that the type of charcoal produced in kilns is not as satisfactory as that produced by the old charcoal heap, though it is not clear whether this belief has a foundation in fact or is on a line with the controversy which formerly existed regarding the relative merits of beehive coke and oven coke. It is true that in the early days of by-product ovens the coke was softer and more abradable than beehive coke; it may equally be that the characteristics of kiln-produced charcoal are susceptible to improvement by modifications in the method of production.

One of the characteristics requisite in charcoal manufacture is production to specification. For certain purposes the charcoal must be especially reactive, and this reactivity depends not only upon the character of the wood used, but also upon the amount of volatile matter left in the charcoal. For some purposes, such as case-hardening, the charcoal should be hard burnt. For other uses, such as the manufacture of carbon disulphide, it should be reactive to sulphur and should preferably contain under 5 per cent. of volatile matter. The kiln process does not enable this control to be obtained, and in addition it has the disadvantage of small capacity per retort per day, measured in terms of production of charcoal.

There has been recently brought to our attention a new method of producing charcoal which is now in operation in this country at the works of the National Carbonising Co. in the Midlands and from which charcoal is being supplied to important sections of the chemical industry. This plant was originally designed for the production of low-temperature coke from non-coking or weakly-coking coals, an operation which the plant successfully performed for some years until the urgent national need for charcoal caused partial temporary abandonment in favour of charcoal making. A considerable

amount is being turned out from these works, and as this plant has the advantage of comparatively low capital costs and large output per retort, it is claimed that large users of charcoal would do well to consider the erection of a plant to meet their own requirements, particularly since heavy transport charges prevent the operation of large central installations. The principle of the process is the distillation of a large bulk of material by direct heating in a vertical cylindrical retort 10 feet in diameter and 24 feet in height (rather like a small blast furnace in appearance), by drawing the products of partial gaseous combustion from a combustion chamber at the top of the retort downward through the charge. Thus, the heat required for distillation is not derived in any way from the carbon of the solid residue. An exhauster maintains a constant suction at the bottom of the retort and withdraws the partially consumed gas together with the new gas formed by distillation. This gas is purified, and may be returned by the exhauster to the top of the retort where it is used for firing. The air supply to the gas burners is regulated so that the gas is always in excess of the air, and by this means the distillation temperature can be controlled.

Downward Distillation

Four zones may thus be visualised as co-existing during this stage. The hot reducing gases from the combustion chamber pass into fully formed charcoal heated to the temperature of these gases; below this is the finishing zone where the charcoal still contains more volatile matter than it will finally possess; below this is the distillation zone proper; the gases leave this zone at a comparatively low temperature and pass into the pre-heating and drying zone which extends to the base of the charge. The downward progression of heat proceeds in this manner for about six or eight hours, by which time the distillation zone has reached the base of the retort. The air supply is then shut off and the gas circulation maintained to dry-cool the hot charcoal. It has been found that the gas exit temperature gives an accurate indication of the state of the charge, and the process is accordingly regulated thereby.

The principle of downward distillation in a reducing atmosphere is claimed to confer two important benefits; in the first place internal combustion of the carbonised charge is prevented, and secondly the gas as it is formed is drawn immediately away into a cool zone; secondary decomposition of the vapours is thereby prevented, and a high yield of good-quality liquid products should result. The method of direct internal heating enables a minimum of gas to be used. Furthermore, by means of direct heating, the retort can be lit up and the process well started within half an hour. Since the retort itself is a simple vertical cylinder lined with firebrick, it is cheap to construct and entails very small maintenance costs.

When the circulation of gas has proceeded long enough to cool the charge, the charcoal, which is dry (no water having been used to cool it), is discharged by gravity by sliding to one side a wedge-shaped bottom door mounted on rollers and operated by a hydraulic ram. The bottom door contains a slotted firebrick grate on which the charge rests and through which the gas is withdrawn.

When freshly-felled timber with a high moisture content is used the quantity of combustible gas produced from the wood is insufficient to provide enough heat for the distillation of the charge. It is, therefore, necessary to provide an auxiliary source of heat until the water is distilled from the wood. At the works of the National Carbonising Co. this is done by using one of the retorts for the carbonisation of coal for the production of low-temperature coke, the surplus gas from this retort being used for the distillation of the wood during the first period of carbonisation in the remainder of the plant. Afterwards sufficient gas is obtained from the wood for heating. Whilst this method is quite successful, it is probably better, in a plant designed solely for charcoal production, to instal a gas producer operating on coke or wood waste and to burn the producer gas in the space above the charge to effect the distillation during this period.

It will be evident that by controlling the supply of gas to the retorts and the temperature which the gaseous products of combustion attain, the volatile matter remaining in the charge and the characteristics of the charcoal can be modified as desired. The same plant acting on the same principle has also been applied to the production of low-volatile pitch coke and here again the content of volatile matter and the quality of the pitch coke can be controlled.

The wood is charged into the retort in pieces about 1 foot cube. Oak, ash, beech, or silver birch are usually used for this purpose. Some 20 tons of freshly-felled wood are contained in each retort per charge and 4 tons of charcoal are produced. Of these 4 tons just over 3 tons are in fair-sized lumps and are used principally for the production of carbon disulphide. The remainder of the charcoal is graded in size for the different markets. A grade of fairly uniform size, about ¼ in. cube, finds a ready market for case-hardening and for purifying copper. The dust is sold for a variety of uses, including the manufacture of foodstuffs. It is stated that the charcoal thus produced is found by users to be superior to kiln charcoal and equal to the product of the charcoal burner. A single retort heated by producer gas can produce 8 tons of charcoal per day.

Peat Carbonisation

Other carbonaceous materials can be used in place of wood. Peat has been successfully carbonised in this retort, but when fibrous peat is used the product is not sufficiently large for CS_2 production. Briquetted peat, which has not this disadvantage, is no longer obtainable. The difficulty of high transport costs with wood, which has already been mentioned, is a handicap to the production of charcoal in this country since the amount of wood available in any particular district is small. Lignite is a promising substitute for wood, and as it has been successfully treated in this retort there would appear to be interesting possibilities for future large scale production of a satisfactory charcoal substitute by this method.

Absorption of Water by Plastics

New American Test Method

A METHOD of measuring the absorption of water by plastics has been developed by committees of the American Society for Testing Materials, which will replace the methods hitherto recommended. Data obtained in an exploratory investigation of the absorption of water by plastics in connection with the preparation of the above test method pertain to the effects of various conditioning procedures, times of immersion, and prior history of the specimens on the values observed for water absorption by plastics.

The plastics examined included phenol-formaldehyde moulded, cast, and laminated materials, urea-formaldehyde moulded and laminated materials, casein, cellulose nitrate, cellulose acetate, ethyl cellulose, polyvinyl chloride-acetate, polyvinyl acetal, polystyrene in moulded and cast forms, polymethyl methacrylate, and cold-moulded plastics of the regular and phenolic types. Data are also presented on the rates of absorption and desorption of water by these plastics for prolonged periods up to about 600 days. The variations in the dimensions of the specimens that are produced by these changes in moisture content are recorded.

The findings are summarised in a paper presented at the 1940 meeting of the Society, which it is hoped it may be possible to record in a later issue of this Journal.

THE ISSUES OF THE *Diario do Govêrno* (Lisbon) of May 22 and June 24 contain notifications under which the export from Portugal of sulphate of copper, tar and pitch is subject to licence issued by the Technical Corporative Council of Commerce and Industry.

CHEMICALS IN SOUTH AFRICA

Increasing Shortage of Many Chemicals Expected

THE subjection of Holland, Belgium and France has cut South Africa off from the source of many of her chemical supplies. Large quantities of perfume and various chemicals were obtained from France, and Belgium supplied many chemicals which it is now expected will have to be obtained from the United States at enhanced prices. A large quantity of the superphosphates used in South Africa came from Holland, and, as it does not seem that alternative sources of supply are likely to be found and as the local industry cannot compensate for the deficiency, there is likely to be a serious shortage of superphosphates until the war ends. South African chemical manufacturers are being allowed to use a number of German patents registered in South Africa, but in spite of this measure and a considerable stimulation of the local chemical industry there is likely to be an increasing shortage of many chemicals, for the scope of the South African chemical industry is limited.

Local concerns are, however, branching out in new directions. The manufacture of disinfectants, anti-friction greases, ball-bearing lubricants, wire-rope dressing, wood preservatives, cement water-proofing compounds, water-softening compounds, soft soap and cleaning preparations is being undertaken by an industrial concern in Johannesburg that has long handled other lines. A new South African industry, the production of an insecticide from the ox-eye daisy, has been established in Durban.

A discovery which may have an important influence on the use of the streams in the Rand mining area for agricultural purposes and on the production of nickel on the Rand for use in the manufacture of stainless steels and steels required for military purposes has been made by Mr. H. Wilson, a bio-chemist employed by the Johannesburg Municipality. He has detected the presence of nickel in fair quantities in Klipspruit and other Rand streams, and reports after exhaustive investigations that about 1000 lb. of nickel could be removed daily by a simple process. This process would at the same time neutralise the acid in many Rand streams which at present makes them unfit even for the irrigation of orchards or gardens. The report has been submitted to the medical officer of health and a copy sent on to the Chamber of Mines, and permission has been asked to make a more extensive survey to certify past research and ascertain the points where the recovery of nickel could be be done.

Last year three samples of pyrethrum flowers were sent by planters in the Arusha district of Tanganyika to the Imperial Institute for analysis. A report has been received stating that the samples were all of good quality, only slightly below that of Kenya commercial shipments and likely to be readily saleable in the United Kingdom. Arrangements are being made to send a trial consignment for tests by wallpaper manufacturers. There is a prospect of the extension of pyrethrum growing to Tanganyika. The Kenya product has obtained very high prices, averaging over £150 a ton, and the only danger is that the market, which is a very small one, may become saturated. It was recently announced in St. Helena that pyrethrum was also to be tried there.

Plastic Food-Containers

Glass-Clear Substitutes for Glass and Metal

THE restriction on metal consumption for food-containers has naturally focussed attention on the possibilities of synthetic plastics, especially in view of the fact that the glass-bottle industry of this country is practically working to capacity. Some months ago it was reported that glass-clear containers had been made in Germany by an injection-moulding process on the basis of a polyamide resin (the same type of resin used in making nylon fabrics). The particular interest with which, it was suggested, this resin might be invested for the food industries arises from its stability at sterilising temperatures and its complete resistance to solvents, oils, fats, and dilute acids. Judging by its chemical origin it seems likely that odour contamination of foodstuffs would be less likely with this type of resin than with the phenolic resins. Injection moulding of polyamide resins rather limits the maximum size of containers; on the other hand this technique makes lighter demands on metal for moulds and other equipment. It has been outstandingly successful in the production of a great variety of small-sized articles from cellulose acetate. The latter material, however, is lacking in the heat stability and other qualities of polyamide resins.

BEILBY MEMORIAL AWARDS

From the interest derived from the invested capital of the Sir George Beilby Memorial Fund, at intervals to be determined by the administrators representing the Institute of Chemistry, the Society of Chemical Industry, and the Institute of Metals, awards are made to British investigators in science to mark appreciation of records of distinguished work. Preference is given to investigations relating to the special interests of Sir George Beilby, including problems connected with fuel economy, chemical engineering, and metallurgy, and awards are made, not on the result of any competition, but in recognition of continuous work of exceptional merit, bearing evidence of distinct advancement in science and practice. In general, awards are not applicable to workers of established repute, but are granted as an encouragement to younger men who have done original independent work of exceptional merit over a period of years.

The administrators of the Fund—the presidents, honorary treasurers, and secretaries of the three participating institutions—will be glad to have their attention drawn to outstanding work of the nature indicated, not later than November 1, 1940. All communications on this subject should be addressed to the Convener, Sir George Beilby Memorial Fund, Institute of Chemistry, 30 Russell Square, London, W.C.1.

U.S. EXPORT LICENCES

H.M. Ambassador at Washington reports by telegraph that the following goods, regarded as essential to national defence, fall within the scope of the export licence requirement imposed by the United States Presidential Proclamation of July 2:—

Aluminium, antimony, asbestos, chromium, graphite, manganese, magnesium, mercury, mica, molybdenum, optical glass, platinum group metals, quartz crystals, tin, toluol, tungsten, vanadium, and products containing any of the above.

Ammonia and ammonium compounds, chlorine, dimethylaniline, diphenylamine, nitric acid, nitrates, nitrocellulose having a nitrogen content of less than 12 per cent., soda lime, anhydrous sodium acetate, strontium chemicals, fuming sulphuric acid.

Metal-working machinery for melting or casting, pressing into forms, cutting or grinding, power-driven, and welding.

A WAR CHEMICAL PLANT to cost approximately $9,000,000, to be erected "somewhere in Western Canada" as part of the explosives programme of the Canadian Dominion Government, will be devoted to the production of ammonia and ammonia derivatives.

Annual Meeting of Benn Brothers, Limited

Stability of the Business Unimpaired

THE forty-fourth annual general meeting of Benn Brothers, Ltd., proprietors of THE CHEMICAL AGE, was held at Bouverie House, Fleet Street, E.C.4, on August 2. Mr. Gordon Robbins, the deputy chairman of the company, presided over a large attendance in the unavoidable absence of Sir Ernest Benn, the chairman. Mr. Robbins, in moving a resolution approving the annual report and accounts, said:—"Sir Ernest Benn has written me a letter which he has asked me to read. He says:—'For the first time that I remember I am obliged to absent myself from the annual meeting of the firm. I leave it with every confidence and delight in your competent hands. You are unable to say what I should have said, about the size of the debt which all the shareholders owe to you personally, and to all your colleagues, for one of the most remarkable year's work in the history of the company.' My colleagues and I are very grateful to Sir Ernest for this appreciation of our efforts. His letter is characteristically generous, but it would not be right if I did not draw attention to other factors which have had an important bearing on the results of a year of unprecedented difficulty.

Adapting Company's Affairs

"The Board's grim task of adapting the company's affairs to a war economy has been made easier by the very nature of the business and by the variety of the national interests which it serves. Our business, perhaps more than most newspaper concerns, permits some elasticity between revenue and expenditure. Another factor which must carry special weight with the shareholders is the cautious and indeed conservative system of finance from which Sir Ernest has never deviated. The figures for the last financial year deal with the most difficult trading period experienced since Benn Brothers became a public company. Yet there is not a drop of water in the accounts, which have been made to take every ounce of punishment that the war has inflicted.

"The financial year opened with two good months for the company, and then the blow fell. When war came in September, a whole series of grave decisions had to be taken, and the Board venture to claim that none of them, however far-reaching, impaired in the slightest degree the stability of the business or the usefulness of the journals which it controls. When firms were being evacuated from London right and left, even from Fleet Street, Benn Brothers decided without hesitation to stay where they were. The Board were convinced that mere alarums were not enough to justify them in making excursions, and the firm gained in prestige and maintained its efficiency by what was regarded at the time as a bold decision and is now also accepted as a wise one. The refusal of the Board to be stampeded into panic measures was also shown by their treatment of the staff. Apart from one or two obvious redundancies in war time, from which transference to other activities was impracticable, the staff remains intact, except for a considerable body of gallant men who, mostly volunteers, are now embodied in His Majesty's Forces. The Board's traditional policy of giving first consideration to the Bouverie House family is attested by the fact that under its various headings of expenditure, that on salaries and wages shows by far the smallest percentage reduction. It was, too, with the greatest pleasure that the Board found it possible at the end of the financial year to maintain its system of periodical wage increases. For the men who had left to defend their country, the Board devised a system of allowances which has been accepted by all as generous. The positions of these men remain open for their return at the end of hostilities.

"The actual carrying on of the company's business has been beset with a mass of difficulties quite outside the experience of members of the Board. The Government proclaimed at the outset, what those working in Bouverie House had known all along, that the maintenance of the Trade Press was of primary national importance. As is the way of Governments, they have been engaged ever since in most successfully dissembling their love for all newspapers and newspapermen. More than any other industry classed by the State as essential in war time, the newspaper Press finds its activities fettered by official controls and regulations. The Ministry of Information and the Censorship present one set of problems, the Paper Controller another, and the Post Office, with new rates, a third. To cap all, the Chancellor of the Exchequer makes hay of one of the Government's professed war aims with his 16 2/3 per cent. Purchase Tax on newspapers, which he classes among goods that in the hard circumstances of war can be dispensed with or the replacement of which can be postponed. It would be difficult to devise a less accurate definition of a necessity called for with the regularity of a recurring decimal.

"I confess that it is a bit of a surprise to me that it has been possible so far to adjust the company's finance to the successive blows which authority has aimed at it. The future may hold something very different in store, but we are here to-day to announce that we survive and are in tolerable health. The price of every article the company uses has gone up, the controlled price of paper alone, our chief raw material, being to-day more than double what it was at the beginning of the financial year. Yet the Board are able to claim that they have maintained intact the essential structure of the business and of its journals. Whereas the daily sheets have been reduced to mere skeletons, the Benn journals present their normal appearance and quality. The best testimony to the heightened importance of the trade paper in war time is shown by the steady return to the fold of advertisers who had strayed in the early weeks of the conflict.

Successful Turkish Supplement

"While there has been heavy contraction in some of the fields covered by the Benn journals there has been expansion in others. The Board have been able to turn their gaze to fields of possible development, more particularly in the export field. The two *Industria Britanicas*, Spanish and Portuguese, are going rapidly ahead, and a successful supplement, in the Turkish language, of the *British Trade Journal* has been launched. The latest Benn recruit bears the title of *Britanya Sanayii*, which, translated, has the same significance as that of our shop-windows for South America, "British Industry."

"As is indicated in the report, comparison between the figures and those of previous years would be difficult if not largely academic. How completely different a war-time economy is from a peace-time one is shown by one item in the profit and loss account. Income tax and National Defence Contribution take £7428 as compared with £4516 last year, or an increase of roughly 66 per cent. The war, too, is directly reflected in the item of trade expenses which would have been down, but are actually more than £500 higher on account of heavy expenditure incurred in the construction of the air raid shelter and other A.R.P. work. The final tally shows a net profit on the year's working of £32,674, as compared with £40,006 a year ago, or a drop of nearly 20 per cent.

"The balance sheet position continues to be very sound. The background remains strong with the general reserve unchanged at £120,000. On the strength of last year's figures the Board have allocated to other reserve funds a total sum of £9000, half of which has had to be earmarked for the depreciation of investments. Out of the net amount left for appropriation the directors have decided to recommend, besides the usual preference dividends, a final dividend of 8 per cent. on the ordinary shares, making, with the interim

(*Continued on page* 74.)

Oxidation of Lubricating Oils*

Some Difficulties of Standardising Oxidation Tests

THE lubricating value of an oil is more or less a physical property, whereas the value of an oil as a lubricant in the wide sense is ascertained from chemical tests. It is unnecessary to emphasise the fact that resistance to oxidation, the influence of emulsifiers and catalysts all affect the life of an oil, and must be taken into consideration when evaluating a lubricant. The production of deposits has been studied extensively. There are still people who believe that the deposit which forms in the combustion space of an internal combustion engine is due to the burning of the lubricant, and the formation of a carbon residue. These people naturally incline to support the carbon residue test. Against them is a strong feeling that this test by itself does not correlate with carbon formation. Analysis has shown beyond all doubt that the deposit on a piston head contains appreciable quantities of combined oxygen. Therefore it must be an oxidation product, and not a result of pyrolysis. This fact makes it imperative to give thought to some form of oxidation test. It is probably quite true that an oil with a low carbon residue test will give little deposit in an engine, but it is not true that an oil with a higher carbon residue test will of necessity give more deposit. Whatever test is adopted, there must be some close relationship between the results of the test and the result in the engine. Of all the many oxidation tests which have been suggested there is not one that has commended itself as an international standard, or even to any one particular nation.

The Sligh test, to take an example, gained popularity in America in 1924. In 1935 it was relegated to a "proposed method," and in 1936 it was abandoned altogether. Yet in 1937 it was adopted in Sweden as an official method, admittedly with some modifications. The Indiana test is really only a modification of the Michie sludge test, and the Air Ministry oxidation test is another modification. At this stage no criticism is being made about the possible advantages of the modifications. Suffice it to say that the various oxidation tests which have been proposed have no doubt served a useful and specific purpose. This is entirely different from standardising a test for universal application. The introduction of a copper catalyst into the Michie sludge test was done to imitate the effect of the copper winding in a transformer. It might well be argued that as copper is not a major constituent in an internal combustion engine the Michie test is not applicable, but it could be made so by replacing copper with iron. Immediately difficulties arise, owing to the numerous forms in which iron exists, and the numerous surface conditions which can be produced, even inadvertently. In order to standardise a test of this kind it is necessary to resort to compromise. If it is decided to use copper or iron then the purity must be specified. For convenience it is an advantage to use the purest materials available. The method of polishing is extremely important. The purity of the air, the rate at which it is bubbled through, and the size of the air bubble must be stated. The dimensions of the apparatus have their influence. It has been shown that when an engine knocks considerable quantities of oxides of nitrogen are produced, and that they have a very material effect upon the oxidation of the oil, possibly so much that they might completely upset any conclusion based on pure air oxidation.

The Air Ministry test was introduced specifically for aero engine oils of a type purchased by the Air Ministry. It was not put forward as a general test for internal combustion engine oils. It would, therefore, be improper to standardise it for universal application and the Air Ministry would probably not support such a suggestion if it were made.

There has been much debate upon the temperature at which an oxidation test should be made. Around the piston rings the temperature must be extremely high, but no one is suggesting that the temperature of the test should compare with piston ring conditions.

These examples are sufficient to show the great difficulties which beset any effort to standardise an oxidation test. It is conceivable that if standardisation should be necessary then more than one oxidation test may also be necessary.

* Extracted from a paper entitled "Stepping Stones to Standardisation" presented to the Institute of Petroleum by Mr. Elliot A. Evans, Chairman of the Lubrication Group and Chief Chemist of C. C. Wakefield and Co., Ltd.

Chemicals from Castor Oil

Sebacic Acid and Capryl Alcohol

CASTOR oil is a convenient source of sebacic acid which is formed from it, in the process in general use, by fusion with caustic soda at high temperature. A violent reaction sets in at about 250° C., capryl alcohol distilling over with the steam, while sebacic acid remains in the hard cake of residual fatty acid. Average yield of sebacic acid may be 35 per cent., the loss arising from charring at high temperatures owing to the difficulty of keeping the hard mass in movement.

In a new process of Bruson and Covert (U.S.P. 2,182,056, to Röhm and Haas Co.) the solidification of the castor oil soap is prevented by carrying out the reaction in aqueous solution in an autoclave. Stirring is not essential although it increases the yield slightly. The new process is reported to give a 47 to 52 per cent. yield of very pure sebacic acid (based on the weight of oil); 156 parts castor oil were added to 79 parts caustic soda in 100 parts water, and the mixture heated in an agitated autoclave for 10 hours at 275° C., when a pressure of 1200 lbs. per sq. in. was developed. The reaction product was discharged into four times its weight of water and heated to 95° C. with stirring. Sulphuric acid was added in quantity just sufficient to give an acid reaction with bromothymol blue when fatty acid and capryl alcohol separated as an oily layer. Sebacic acid remained in the solution and was precipitated by further acidification with sulphuric acid, and finally cooled to 10° C., filtered, washed with cold water and dried at 80° C. Yield of pure white material (m.p. 129°-130° C.) was 47 per cent. (calculated on the original weight of castor oil) or 87.3 per cent. of that theoretically possible. A bigger output is attained by continuous operation of the autoclave treatment, the castor oil-alkali mixture being run into the autoclave at a rate ensuring a reaction time of six hours at 285°-300° C., while reaction product is discharged through a valve at a corresponding rate.

Technical capryl alcohol is isolated in 23.4 per cent. yield (based on the weight of castor oil) by steam distillation of the separated oily layer. It contained 72 per cent. octanol-2 and 28 per cent. methyl hexyl ketone. Octanol has found some application as an ingredient of cellulose lacquers and of penetrants for textile finishing. Methyl hexyl ketone is used to some extent in perfumery. Sebacic acid is used in the manufacture of resins and plasticisers (see THE CHEMICAL AGE, July 20, 1940, p. 33).

A Chemist's Bookshelf

CHAMBERS'S TECHNICAL DICTIONARY, edited by C. F. Tweney and L. E. C. Hughes. London: W. & R. Chambers, Ltd. Pp. viii + 957. 15s.

The need has existed for many years for a convenient yet sufficiently comprehensive dictionary of technical terms which should serve not only for the specialist but also for the technically minded man-in-the-street and for students and interested workers. Much has happened in the development of science and technology since the senior editor of the present work, Mr. Tweney, brought out in 1906 his earlier "Technological and Scientific Dictionary," and the volume under review can justly be claimed to present a full and representative cross-section of the language of science and technology to-day. The book has the merit that, in addition to being written by specialists, the information is set forth in an explicit form and in language more readable than that of the usual specialised glossaries. Over 120 subjects are covered, comprising definitions of terms of importance in pure and applied science, in all branches of engineering and construction, and in the larger manufacturing industries and skilled trades; and in each case the selection and definition of the terms has been entrusted to recognised authorities. The entries in the field of chemistry have been prepared by C. J. W. Hooper, B.Sc., Ph.D., R. J. Israel, M.A., Ph.D., and T. Singleton, B.Sc. Plastics are dealt with by C. J. W. Hooper and C. F. Tweney; and J. M. Robertson, D.Sc., Ph.D., of the Imperial College of Science and Technology, has contributed the metallurgical definitions. The entries have good cross-references. A table of chemical elements and the periodic table are given at the end of the book, and a useful bibliography of chemistry books is appended.

PHYSICAL CONSTANTS OF HYDROCARBONS (Vol. II), by Gustav Egloff. London: Chapman and Hall. New York: Reinhold Publishing Corpn. Pp. 605. 72s.

Little more than a year after the publication of the first volume appears the second volume of this four-volume work of reference—a work of the highest importance in view of the rapid developments in the synthesis, purification, and methods of determining the physical constants of hydrocarbon products, not to mention the increasing industrial demand for these materials. The general scope of the work was dealt with in THE CHEMICAL AGE (1939, *41*, 1044, 10); the present volume deals with the melting point, boiling point, specific gravity and index of refraction of the alicyclic hydrocarbons. All cyclic hydrocarbons containingn non-aromatic rings are considered, including the cycloparaffins or cyclanes and the cycloölefines or cyclenes. Considerable difficulty in determining many of the constants has been encountered, owing to the fact that many of those reported in the literature refer to geometrical isomers rather than to individual compounds, also to partial isomerisation (due to catalytic influences) during the actual process of determination. A field for further study is here indicated.

STARCH AND ITS DERIVATIVES, by J. A. Radley, M.Sc., A.I.C. London: Chapman and Hall. Pp. x+346. 22s.

This book, being Vol. II of a series of monographs on applied chemistry under the editorship of Dr. E. Howard Tripp, will recommend itself by its exhaustive contents, as it summarises all the practical and theoretical work done in its special branch of the chemical industry. The manufacture of dextrin, especially, about which very little has been published, is treated in most useful detail. The introduction of manufactured starch into England to any appreciable extent appears to have occurred between 1561-1564, but not until after 1830 was it used in the textile and paper trades. Dextrin appears to have been made commercially by the acid process about 1860. The chemical structure of starch has engaged the attention of many workers and investigation of it is still proceeding. This subject and the manufacture of starch and starch products are described in detail from the scientific and technological standpoints with numerous references to international literature. The wide field of the industrial applications of starch and its products is dealt with in a special section, covering the paper, textile, and soap industries, cosmetic, pharmaceutical, and horticultural uses, fireproofing preparations, etc. The by-products of starch manufacture, such as gluten and waste water containing soluble and colloidal impurities, are also considered. The book is well illustrated and supplied with many diagrams and tables. It will be of considerable service both to chemists and to manufacturers, and the many references given make it a standard book on its special subject.

THE CHEMICAL CONSTITUTION OF THE NATURAL FATS, by T. P. Hilditch, D.Sc. London: Chapman and Hall. Pp. 438. 35s.

Nature has set the chemist no petty problem in the elucidation of the structure of the natural fats. Each of the many thousands of known fats is indeed a problem in itself. The old conception of fats as mixtures of a few simple glycerides has long been thrown overboard, although it still lingers in a few textbooks of general chemistry. Fats are undoubtedly triglyceride mixtures, but each glyceride itself is generally mixed (*e.g.*, oleodipalmitin) and a large number of mixed glycerides may occur together in each fat. The methods of approach to the subject and the valuable results achieved down to the end of 1938 are critically discussed in this work which should become the fat-research workers' bible. The earlier chapters deal mainly with the component fatty acids of the fats of aquatic flora and fauna, of land animals and of plants (in that order). In a good many cases the proportions of individual acids in the total mixed glycerides have been determined and the acids themselves identified. Three chapters are next devoted to the far more formidable problem of the structure of the component glycerides. Professor Hilditch and his associates at Liverpool have specialised in this field since 1927, and they have succeeded in laying a solid foundation for future workers. It is largely owing to their researches that the proportions of individual mixed glycerides in some fats are now known, as well as the actual configuration of some glycerides such as β-oleodistearin and β-palmito-oleostearin. The concluding chapters cover the biochemistry of fats, the structure of individual fatty acids, synthetic glycerides (by Dr. M. L. Meara) and laboratory technique. The indexing arrangement is unusually good. A general index of subjects is followed by separate indices of individual fats and waxes, plant families, individual fatty acids and individual glycerides.

AN INTRODUCTION TO CHEMISTRY (Parts II and III, Physical and Organic Chemistry), by A. C. Cavell. London: Macmillan. Pp. 711. 4s.

In one sense a continuation of Part I of this work, Parts II and III actually fulfil a separate function in that they bridge the gap between School Certificate chemistry and more advanced books. The author claims that this volume is of special use to students who wish to know something of physical and organic chemistry as a subsidiary subject, since, being very reasonably priced, it avoids the necessity for obtaining advanced works on the subject which are necessarily more costly. He justifies his claim by the admirably clear way in which he gives a brief outline of such subjects as isotopes and the electronic theory of valency.

GADD'S SYNOPSIS OF THE BRITISH PHARMACOPŒIA (13th Edition). London: Baillière, Tindall and Cox. Pp. 200. 3s. 6d.

This pocket-sized volume was last revised in 1937, and to this latest edition is added a synopsis of the second official addendum to the British Pharmacopœia which has just been issued.

Personal Notes

MR. PHILIP B. MARSHALL, B.Phar., Rammell Scholar for 1939, has been awarded the B.Sc. degree by London University.

* * * *

MR. W. MCLENNAN, of Carron, Speyside, has been appointed to succeed Mr. Alexander Gordon, as inspector of the group of 16 distilleries belonging to the Distillers Company, Ltd.

* * * *

MR. MAURICE E. DEEN, who recently resigned from the boards of the Eastern, Southern and Western sections of the Anglo-Dutch Petroleum Co., continues as chairman and managing director of the Anglo-Dutch Petroleum Co., Ltd.

* * *

MR. GEORGE CHRISTIE, Cowdenbeath, son of the late Mr. George Christie, colliery manager, has gained a diploma in chemistry in the Heriot Watt College, Edinburgh, and has received an appointment with I.C.I., Ltd. He has been employed in the chemical laboratory of the Fife Coal Co., Ltd., at Cowdenbeath.

OBITUARY

MR. LUDFORD CHARLES DOCKER, founder, with his brothers, Dudley and William, of the paint and varnish manufacturing firm of Docker Brothers, Ltd., died last week at Stratford-on-Avon, at the age of 80.

* * * *

The death is announced of MRS. TUNGAY, wife of MR. SYDNEY J. TUNGAY, a director of Haughton's Metallic Co., Ltd. Mrs. Tungay took an active interest in industrial chemistry and the loss of her presence will be deeply felt by many members of the industry.

* * * *

MR. HENRY KING BURNET, who was managing director of Leather's Chemical Co., Ltd., Canal Road, Bradford, died last Saturday at his home in Selborne Villas, Bradford. He was vice-president of the National Sulphuric Acid Association. Mr. Burnet was well known not only for his long association with the chemical industry, but also for his fine collection of Chinese jades and bronzes.

New Control Order

Methyl Alcohol

THE Board of Trade announce that from August 5 the open general licence authorising the import of methyl alcohol from all countries specified has been revoked and separate licences to import will now be required. Applications for licences to import methyl alcohol should be submitted in duplicate to Molasses and Industrial Alcohol Control, Great Burgh, Epsom, Surrey. Forms on which the applications should be made are obtainable from the Import Licensing Department or from the Offices of Collectors, H.M. Customs and Excise. It is pointed out that separate licences will not be required for any such goods proved to the satisfaction of the Commissioners of H.M. Customs and Excise to have been despatched before August 5 and which are imported into the United Kingdom before October 5, 1940. Importers are warned that they should not arrange to ship any further goods of these descriptions to the United Kingdom until they have obtained a licence.

NON-FERROUS METAL PURCHASES

The Controller of Non-ferrous Metals has announced that his department is now prepared to purchase copper produced from works in this country, providing its content is not less than 97.25 per cent., at £53 per ton f.o.r. sellers' works. Also rough copper assaying 99 per cent. at £54. Delivery must be made within three months of the date of the contract. The Controller is also prepared to buy pig-lead refined in this country at £22 10s. per ton f.o.r. sellers' works, provided that the lead content is 99.98 per cent. or over.

British Chemical Prices

Market Reports

THERE is little change of any importance to record in the London market for general chemicals and the volume of inquiry both for home and export is reported to be satisfactory. Home makers' contract deliveries are well up to schedule and the movement into consumption on the whole is of fairly substantial dimensions. The price position for most of the heavy chemicals is steady with quotations moving within narrow limits. In the market for coal tar products trade is pursuing a quiet and steady course with good quantities moving into consumption. Values show little change, but quotations for carbolic acid crystals and solvent naphtha are firm in tone.

MANCHESTER.—In spite of the fact that there has been no Bank Holiday this week the Manchester chemical market has not entirely escaped holiday influences and no more than a moderate volume of fresh inquiry has been dealt with during the past few days, while deliveries into consumption against old contracts have also been affected to some extent. On the whole, however, fair quantities of textile and other heavy chemicals are being taken up, although as regards the former the outlook for the Lancashire cotton trade continues to be somewhat obscure. The undertone of the market is firm pretty well throughout the range. One or two of the by-products are not too strong and business is no more than moderate, but benzol and other light materials continue to meet with a steady demand at firm prices.

GLASGOW.—The Scottish heavy chemicals trade remains firm with a good brisk demand. In war time the hard driving of man-power is all right but it has its limitations and the powers that be soon realised that "all work and no play makes Jack a dull boy"—hence the feeling which had arisen that some sort of relaxation was necessary if output was to be kept at the peak. Thus the idea of stagger holidays was born and the result was that output remained undiminished. Further, this result is confirmed by increased orders for heavy chemicals during recent days while inquiries are still plentiful with a steady volume of business continuing.

Price Changes

Carbolic Acid.—Crystals, 9d. to 11d. per lb.; crude 60's, 3s. 3d. to 4s. 4d., according to specification.

Citric Acid.—MANCHESTER: 1s. 5¾d. per lb.

Cresylic Acid.—99/100%, 2s. 4d. to 3s. per gal., according to specification. MANCHESTER: 2s. 6d.

Naphtha.—Solvent, 90/160°, 1s. 10d. to 2s. per gal.

Latest Oil Prices

LONDON.—August 8.—For the period ending August 31 per ton, net, naked, ex mill, works or refinery, and subject to additional charges according to package and location of supplies:—LINSEED OIL, raw, £44. RAPESEED OIL, crude, £44 5s. COTTONSEED OIL, crude, £31 2s. 6d.; washed, £34 5s.; refined edible, £35 12s. 6d.; refined deodorised, £36 10s. SOYA BEAN OIL, crude, £33; refined deodorised, £37. COCONUT OIL, crude, £28 2s. 6d.; refined deodorised, £31 7s. 6d. PALM KERNEL OIL, crude, £27 10s.; refined deodorised, £30 15s. PALM OIL, refined deodorised, £33. GROUNDNUT OIL, crude, £35 10s.; refined deodorised, £40. WHALE OIL, crude hardened, 42 deg., £30 10s.; refined hardened, 42 deg., £33. ACID OILS.—Groundnut, £19; soya, £17; coconut and palm kernel, £22 10s. ROSIN, 25s. to 30s. per cwt., ex wharf, according to grade. TURPENTINE, 53s. per cwt., spot, American, including tax, ex wharf, barrels, and ex discount.

HULL.—August 7.—American turpentine, spot, 54s. 6d. per cwt. in barrels ex store.

SUBSTITUTES FOR COPPER SALTS

The enormous consumption of copper sulphate for agricultural purposes in Italy, chiefly in anticryptogamic compositions for vines, has led to a search by the Italian chemical industry for alternative agents. According to Ital. P. 374,883 of Soc. An. di Rumianca, compounds of equivalent value are obtained from mixtures of certain salts of zinc, aluminium, or iron after activation with a mercury salt. Particularly attractive from the Italian standpoint is the employment of leucite as a source of aluminium (see THE CHEMICAL AGE, July 27, 1940, p. 49). This patent claims the use as vine protectives of alums formed by direct action of mineral acids on leucite, the products being fused in presence of a mercury salt when a homogeneous crystalline material is produced after cooling. Quantitative details are omitted from the specification. Italian agricultural consumption of copper sulphate and other copper salts in 1938 is given in official statistics as 125,000 tons, equivalent to some 37,000 tons of copper.

General News——From Week to Week

IT IS REPORTED THAT 500,000 tons of sugar (white and raw) were produced last year by the British Sugar Corporation from a crop showing the highest yield per acre on record in the U.K. The crop also produced nearly 300,000 tons of dried pulp, and 48,000 tons of saleable molasses.

NEW BRITISH STANDARDS have recently been issued as follows: No. 914/1940, Tests for Laboratory Porcelain (2s. 3d. per copy, post free); and No. 866/1940, Parts 1 and 2, Schedules of Sizes for Tins and Cans. Part 1 of the latter covers tins and cans for food products; Part 2 deals with commodities other than food products (each part 1s. per copy post free).

PRODUCTION OF BRUSH-KOELA GAS PRODUCERS is now proceeding on a continuous basis at the Loughborough works of the Brush Electrical Engineering Co., Ltd. A recent reorganisation of the manufacturing facilities has enabled the company to give expeditious delivery on its current order book and to cope with increased demand which is expected to result from the considerably widened application of the producer.

ON THE CHEMICAL SIDE of Low Temperature Carbonisation, Ltd., valuable markets have been established for the various types of cresylic acid and other products. This was stated by Col. Whiston A. Bristow, the chairman, at the company's annual meeting last week. Since the commencement of the war, he added, they had exported to the United States and Canada large quantities of refined acids for the mining, chemical and plastics industries, and a considerable part of their future output was already sold.

THE UNITED KINGDOM FIRE AND ACCIDENT INSURANCE CO., LTD., has been registered to take over the business of the Dominion of Canada General Insurance Co. hitherto done in the United Kingdom. The capital of the new company is being subscribed by the United Kingdom Provident Institution, the chairman of which is Sir Ernest Benn, Bart., who is also Chairman of Benn Brothers, Limited, proprietors of THE CHEMICAL AGE. The directors of the new company are all associated as directors and officials with the United Kingdom Provident Institution; its offices will be at 195 Strand, London, W.C.2.

Foreign News

BAUXITE EXPORTS FROM JOHORE, Malaya, were 21,336 long tons for the last quarter of 1939.

THE ERECTION AND OPERATION of a new wood-pulp and tannic extract plant in the town of Grado, Asturias, is reported to have been authorised by the Spanish Ministry of Industry and Commerce.

EXPORTS OF EGYPTIAN PHOSPHATE ROCK last year came to 468,217 metric tons, an advance of nearly 66,000 tons on 1938, but still considerably below the record figure of 544,077 tons reached in 1936.

THE GOVERNMENT OF BURMA is examining various proposals to increase the output of tin and wolfram, it was announced last week. It is understood that experts will be appointed to investigate and collect information for opening a separate department of mining.

OFFICIAL RESEARCH COMMITTEES, states a Reuter message, are being set up at Nairobi to investigate the possibilities of power alcohol and munitions manufacture in East Africa. It is likely that a central body with wider powers and representing all territories covered by the East African Governors' conference system will be created later.

A MAGNESITE DEPOSIT at Bulong, 20 miles from Kalgoorlie, W. Australia, has been pegged out by the Broken Hill Proprietary Co. to augment supplies of the mineral for their Newcastle steel works. Estimated to contain a million tons of high-grade material, the deposit has been known since 1914, but up till now has been without a market.

THE GERMAN AUTHORITIES ARE PERMITTING the use of ethyl and propyl *p*-hydroxy benzoates, as well as their sodium salts, as preservatives for a wide variety of food products. These esters are already well known as innocuous preservatives for cosmetics and other non-edible preparations. The foods which may now be preserved with their aid in Germany include fruit pulps, liquid fruit pectin, fruit juices, stewed plums, liquid fondant masses, liquid coffee extracts, and gelatine serving as coating for preserved meats.

GREECE HAS REPLACED COAL from abroad by the use of lignite mined in the country. Production has reached 400,000 tons yearly, it is stated, as compared with 80,000 tons before 1937.

EXPORTS OF WATTLE BARK and extract from the Union of South Africa increased in value from £907,952 in 1938 to £1,307,052 last year. It is stated that the recent introduction of Government grading and inspection of bark worked well during the year.

IT IS ANNOUNCED THAT the Mijnmaatschappij Curaçao, an affiliate of John Godden and Co., Ltd., of London, which has been engaged in the mining of phosphate rock at Newport, Curaçao, since 1875, has ceased its activities for the duration of the war. A skeleton staff only will remain at the plant in order to keep the machinery in order and protect the property.

ACCORDING TO PRESS REPORTS FROM AUSTRALIA, negotiations are in train between the Broken Hill Pty. Co., Ltd., and Imperial Chemical Industries of Australia and New Zealand, Ltd., to form a new company to be called Newcastle Chemical Works, Ltd., for the establishment of a chemical works at Newcastle, N.S.W. Half the shares would be held by each promoting company.

A METHOD FOR QUANTITATIVE DETERMINATION of quartz by X-ray diffraction is described in R.I. 3520, published recently by the Bureau of Mines (U.S. Dept. of the Interior). The method should be particularly applicable to industrial-hygiene studies, as it positively identifies quartz, it requires only a small sample, and the small particle size of industrial dusts does not adversely affect the results. The accuracy should be satisfactory for most purposes, and time required for analysis is not excessive.

THE DIRECTOR OF AGRICULTURE, BARBADOS, has been advocating for some time the use of muriate of potash as a fertiliser for the sugar canes. The planters who have used it have found it so beneficial that most of them now are applying it to the canes twice a year, in the early spring and in the autumn. Muriate of potash is usually mixed with ammonium sulphate which remains the most popular fertiliser in the island. Potassium sulphate and potassium nitrate are no longer used extensively as their cost is considered too high.

ANNUAL MEETING OF BENN BROTHERS, LIMITED

(*Continued from page* 70.)

dividend, 12 per cent. for the year. The last figure of all is the carrying forward of a balance of £8748, a pound or two more than last year."

Mr. E. Glanvill Benn, managing director, seconded the resolution. He said that Mr. Robbins had read out to them Sir Ernest's letter, but he did not say very much about his own work. He thought the secret of Mr. Robbins's success was that he was the guide, protector and friend of every man and woman in that business. The way in which the subscribers continued to take their journals was very remarkable; it was almost an embarrassment, the Paper Controller being what he was. One of the particular features for which the subscribers bought the journals was their comment on the national and international situation as it affected trade and industry. The world might be crashing about their ears; yet the journals went on as the steady influential organs they were, well read by a very large section of the trading community, and of greater value to readers in war time than in peace time.

The resolution was carried unanimously.

Mr. Keon Hughes moved and Mr. W. Vestey seconded a resolution for the re-election of Mr. C. E. Hughes and Mr. Norman French as directors of the company. This was carried.

On the motion of Mr. R. L. Webb, seconded by Mr. H. W. Duck, Messrs. Cassleton Elliott and Co., were re-elected auditors for the ensuing year.

Mr. B. A. Glanvill proposed a vote of thanks to the chairman, which was seconded by Mr. Frank Elliott, and cordially endorsed.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Complete Specifications Open to Public Inspection

SYNTHESIS OF ADIPIC ACID DINITRILE.—I. G. Farbenindustrie. Aug. 26, 1938. 23755/39.

MANUFACTURE OF VAT DYESTUFFS.—I. G. Farbenindustrie. Aug. 22, 1938. (Cognate Application, 23829/39.) 23828/39.

COATING SURFACES WITH CHROMIUM, chromium compounds, or chromium alloys.—H. F. A. Lubbe, and E. Kruppa. Aug. 18, 1938. (Cognate Applications, 23846-8/39.) 23845/39.

PRODUCTION OF FERRO-ALLOYS with low content of carbon.—G. Horgard. Aug. 22, 1938. (Cognate Applicatino, 23888/39.) 23887/39.

PRODUCTION OF LOW-POLYMERIC POLYSTYROLS.—Fides Ges. für die Verwaltung und Verwertung von Gewerblichen Schützrechten. Aug. 18, 1938. 23920/39.

RESINOUS COMPOSITIONS.—British Thomson-Houston Co., Ltd. Aug. 23, 1938. 24183/39.

ACRYLATE POLYMERS, and method of producing same.—Pittsburgh Plate Glass Co. Aug. 23, 1938. 24210/39.

SEPARATION OF THE CONSTITUENTS OF COAL.—M. F. Bertrand. Dec. 13, 1937. (Divided out of 35569/38.) 24050/39.

MANUFACTURE OF AZO DYESTUFFS.—I. G. Farbenindustrie. April 26, 1938. 27638/38.

PROCESS FOR THE PRODUCTION OF BERYLLIUM COMPOUNDS which are free from fluorine.—I. G. Farbenindustrie. April 5, 1938. 2356/39.

PROCESS OF RECOVERING PHOSPHORUS from phosphorus sludges. I. G. Farbenindustrie. April 29, 1938. 2658/39.

METHOD OF SUBLIMATING HYDROCARBON FUELS.—R. de Lamprecht. June 15, 1938. 5493/39.

FLOTATION REAGENTS.—American Cyanamid Co. Aug. 24, 1938. 7709/39.

MANUFACTURE OF CELLULOSE ETHERS.—Hercules Powder Co. Aug. 25, 1938. 10673/39.

ELECTROLYTIC CONDENSERS.—A. H. Hunt, Ltd. Sept. 2, 1938. 14134/39.

MANUFACTURE OF CATALYSTS, and the use of such catalysts in the cracking of hydrocarbons.—Standard Oil Development Co. Aug. 31, 1938. 17061/39.

PROCESS FOR THE SEPARATION OF NITRIC ACID from organic nitro compounds.—J. Meissner. Aug. 26, 1938. 19497/39.

PROCESS FOR THE GENERATION OF SYNTHESIS GAS with the simultaneous recovery of aromatic hydrocarbons.—Didier-Werke A.-G. Aug. 27, 1938. 20704/39.

PROCESS OF HEAT TREATING METALS, especially aluminium base alloys.—I. G. Farbenindustrie. Sept. 2, 1938. 22029/39.

APPARATUS FOR DETERMINING THE GASOLINE and the like content of gases.—Metallges A.-G. Aug. 26, 1938. 22894/39.

REMOVAL OF ACID CONSTITUENTS from dilute waste gases.—H. F. Johnstone. Aug. 25, 1938. 22925/39.

PROCESS FOR THE MANUFACTURE OF ALKENYLATED AROMATIC HYDROXY CARBOXYLIC ACID.—I. G. Farbenindustrie. Aug. 24, 1938. 23001/39.

METHOD OF IMPROVING BORON CARBIDE containing graphite.—I. G. Farbenindustrie. Aug. 24, 1938. 23091/39.

PRODUCTION OF WATER-SOLUBLE DERIVATIVES OF ISO-ALKYLOL AMIDES.—J. Katz. Aug. 31, 1938. 23594/39.

REFINING VITAMINIFEROUS MATERIALS.—National Oil Products Co. Aug. 30, 1938. 23771/39.

ACYLATED CYCLOPENTADIENES and their polymers, and process of producing same.—Armour and Co. Sept. 2, 1938. 24063/39.

ACYLATED INDENES AND POLYMERISATION PRODUCTS THEREOF, and processes of preparing same.—Armour and Co. Sept. 2, 1938. 24064/39.

SYNTHETIC RESINS.—Norton Grinding Wheel Co., Ltd. Aug. 27, 1938. 24140/39.

POLYMERISABLE COMPOUNDS.—Norton Grinding Wheel Co., Ltd. Aug. 27, 1938. (Cognate Application, 24142/39.) 24141/39.

PROCESS FOR MANUFACTURE OF PHOSPHORIC ACID DERIVATIVES of bactericidal compounds containing sulphur.—F. Hoffman La Roche and Co. A.-G. Aug. 27, 1938. 24152/39.

PROCESS FOR CARRYING-OUT CHEMICAL REACTIONS IN MELTS.—Deutsche Gold-und Silber-Scheideanstalt Vorm. Roessler. Aug. 31, 1939. 24199/39.

MANUFACTURE OF FLUORANTHENE DERIVATIVES.—Soc. of Chemical Industry in Basle. Aug. 27, 1938. (Cognate Applications, 24262-3/39.) 24261/39.

MANUFACTURE OF VAT DYESTUFFS.—Soc. of Chemical Industry in Basle. Aug. 27, 1938. (Cognate Applications, 24265-6/39.) 24264/39.

METHODS OF COATING LUMINESCENT ENVELOPES.—British Thomson-Houston Co., Ltd. Aug. 24, 1938. 24294/39.

CORROSION-RESISTANT APPARATUS.—E. I. du Pont de Nemours and Co. Aug. 26, 1938. 24309/39.

MANUFACTURE OF POLYMERIC MATERIALS, and compositions containing the same.—E. I. du Pont de Nemours and Co. Aug. 26, 1938. 24441/39.

MANUFACTURE AND PRODUCTION OF PIPERIDINE.—I. G. Farbenindustrie. Aug. 25, 1938. 24408/39.

POLYMERISED ACYLATED COUMARONES.—Armour and Co. Sept. 2, 1938. 24528/39.

Specifications Accepted with Date of Application

PROCESS FOR THE MANUFACTURE OF ANHYDROUS METAL FLUORIDES free from oxide.—Seri Holding S.A. Sept. 18, 1937. (Addition to 496,773.) 519,199.

CRACKING OR COKING HYDROCARBON OILS.—N.V. Nieuwe Octrooi Maatschappij. Sept. 21, 1937. 519,310.

WORKING-UP POLYVINYL ACETALS.—Deutsche Celluloid-Fabrik A.-G. Sept. 17, 1937. 519,314.

MANUFACTURE OF DISAZO DYESTUFFS.—I. G. Farbenindustrie. Oct. 7, 1937. 519,326.

MANUFACTURE OF COMPOSITIONS OF LEAD and its oxides.—Richardson, Co. June 27, 1938. 519,332.

FILTERS FOR LIQUIDS, particularly liquid fuels.—R. Emanuel. Sept. 15, 1938. 519,219.

Chemical and Allied Stocks and Shares

DESPITE the fact that sentiment in the stock and share markets continued under the disposition to await the next turn in the war news, good class securities remained very firmly held. Strength was again shown by British Government securities, and industrial shares appeared to have a firm undertone, although quotations for the latter were in many cases tested by very little business.

Shares of chemical and kindred companies showed few movements, but they were mostly in favour of holders. Imperial Chemical were subject to moderate fluctuations, and at 25s. were little changed on balance, while the 7 per cent. preference were firm at around 29s. Borax Consolidated deferred units were firmer at 22s. 6d. and business in the 4½ per cent. first debentures was recorded at 101½. Fison Packard and B. Laporte were inactive, but remained at 30s. and 48s. 9d. respectively. Greeff-Chemical Holdings 5s. units kept at par, and Monsanto Chemicals 5¼ per cent. preference at 21s. 3d. Business in Sanitas Trust 10 per cent. preference took place at 21s. 10½d. and in Cellon 6 per cent. preference at 17s. In fact, it appeared that the favourable yields obtainable on numerous preference shares were attracting rather more attention, but in many instances it was found they remained tightly held and were not always easy to buy at around prices indicated by current quotations. The latter were inclined to be nominal in character owing to the small amount of business in evidence.

Reckitt and Sons' ordinary shares were better at 80s., and Cerebos remained at £7. Moreover, there was again a better tendency in British Aluminium, British Oxygen, Murex, Turner and Newall and various of the other higher-priced shares. British Match improved to 26s. 3d., and Dunlop Rubber at 27s. were also slightly higher on balance, while elsewhere, Imperial Smelting were a few pence better at 6s. 9d., although General Refractories kept at 5s. 6d. and Blythe Colour were quoted at 5s. Triplex Glass continued fairly active, pending the forthcoming dividend announcement, which is awaited with a good deal of interest. Few dealings took place in United Glass Bottle and shares of other glass manufacturers, although Canning Town Glass transferred around 3s. 9d. Elsewhere, Barry and Staines were higher at 21s. 10½d. and the 6 per cent. preference shares showed business at 22s. 3d. Lever and Unilever became easier at 19s. 4½d., and the 8 per cent. preference were quoted to give a "middle" price of 21s. 3d.

The ordinary units of the Distillers Co. were steady at 55s. 6d., and United Molasses were little changed at 19s. 9d., while Wall Paper deferred units were better at 12s. 6d. International Paint kept at 62s. 6d., and other paint shares were little changed on balance; Pinchin Johnson were quoted at 15s. 3d., and Goodlass Wall transferred at 6s. 3d. at one time. Among textile shares few movements were recorded and attention centred on Courtaulds, sentiment in regard to which has remained under the interim dividend. Changes in iron and steel securities, although small, were mostly in favour of holders; Stewarts and Lloyds were 34s. 6d. Staveley 38s. 9d. and Dorman Long 15s. 7½d. Tube Investments were firm at 76s. 3d. Cement shares were favoured and Associated Cement improved to 53s. 9d.

In regard to companies with interests in retail and allied trade, the disposition in the market is to assume that current quotations already discount the new Purchase Tax. Boots Drug, however, were slightly easier at 36s. 9d., although Timothy Whites were steady at 16s. 6d., as were Sangers at 18s. British Drug were quoted at 20s., and Beechams Pills 2s. 6d. deferred shares at 7s. 4½d. Following the reaction on the passing of the Anglo-Iranian final dividend, leading oil shares have developed a steadier undertone.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

PAUL QUINN, LTD., London, E.C., paint manufacturers. (M., 10/8/40). July 29, £1000 debentures, part of a series already registered. *—. March 3, 1939.

Satisfactions

MID-CORNWALL CHINA CLAY CO., LTD., St. Austell. (M.S., 10/8/40). Satisfaction July 24, £4000 registered February 12, 1936.

Companies Winding-Up Voluntarily

BURY "CHROME" PLATING CO., LTD. (C.W.U.V., 10/8/40.) General meetings of creditors and members at the offices of Messrs. E. O. Mosley and Co., incorporated accountants, 16 Bolton Street, Bury, on September 4, 1940, at 10.30 and 11 a.m. respectively.

New Companies Registered

British Resin Products, Ltd. (362,643).—Private company. Capital of £50,000 in 50,000 shares of £1 each. Manufacturers of and dealers in resins for varnishes, lacquers, paints, adhesives and moulding powders and plastic materials of all descriptions, manufacturers of chemicals and chemical products, etc. Directors: Rolf H. Stein, Widmore Farm, Asheridge, Chesham, Bucks; Hector H. Woolveridge, Cecil G. G. Hayman. Solicitor: Francis Redfern, 21 St. James's Square, S.W.1.

Synthetic Waxes, Ltd. (362,678).—Private company. Capital £500 in £1 shares. Manufacturers, importers and exporters of and dealers in wax, chemical products, resin, turpentine, oils, etc. Subscribers: M. Schreger, G. B. Cumings. Registered office: 91 Charterhouse Street, E.C.1.

Olinol, Ltd. (362,690).—Private company. Capital £100 in 2,000 shares of 1s. each. Manufacturers, importers and exporters of and dealers in oils and oleaginous compounds and emulsions, etc. Subscribers: Rupert E. Cross, and Matthew H. Bedford. Solicitors: H. L. F. Berry & Co., 40 King Street, Manchester. Registered office: 44 King Street, Manchester, 2.

Croager Bros. (Homerton), Ltd. (362,645).—Private company. Capital £3000 in 3000 shares of £1 each. To acquire the business of "Croager Bros.," carried on by A. L. Croager, at Sutton Place, Homerton, E.9, and to carry on the business of manufacturers, importers and blenders of and dealers in all kinds of lubricating, burning, insulating, fixed, paint-making, edible and essential oils, etc. Directors: Arthur L. Croager, Mrs. Evelyn G. Croager, Fred Weatherill. Solicitors: Baily and Coff, 55 Spital Street, Dartford, Kent. Registered office: Sutton Place, Homerton, E.9.

Disintegrators, Ltd. (362,476). Private company. Capital: £1000 in 15,000 "A" ordinary and 5000 "B" ordinary shares of 1s. each. General and analytical chemists, manufacturers of powder from paper materials, strawboard, kraft, cotton mill and other waste capable of being disintegrated or turned into powder for use as fillers, disinfectants, manures, etc. Directors: Arthur O. Burton, Major Jas. W. Henderson, John J. A. Talbot and Robert D. Knight. Solicitors: Mount Sterry & Co., 24 Martin Lane, Cannon Street, E.C.4. Registered office: 24 Caledonia Street, Kings Cross, N.1.

A 40-page catalogue, described as the first complete publication on thermocouples issued by the LEEDS AND NORTHRUP Co., Philadelphia, U.S.A., not only lists a comprehensive line of assemblies with their parts and accessories, but includes general information on the correct choice of couples. Tabulated in simple form, this information should be helpful to users as a guide to the best choice for the application at hand. Illustrations and lists are so arranged that parts and accessories, as well as complete assemblies, are easily identified.

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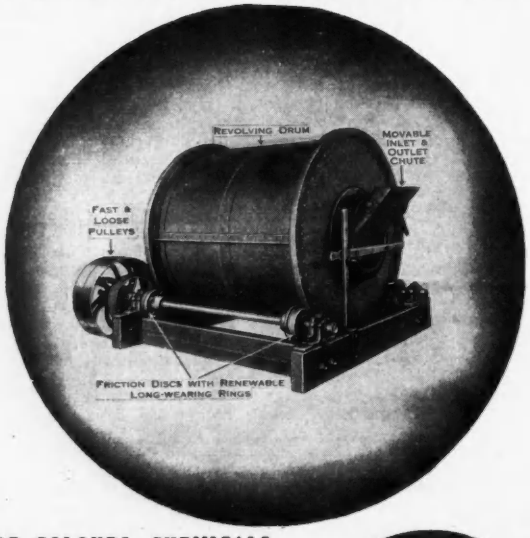

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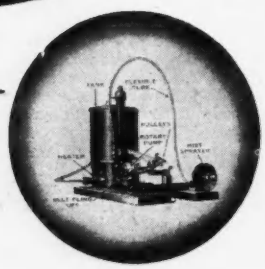

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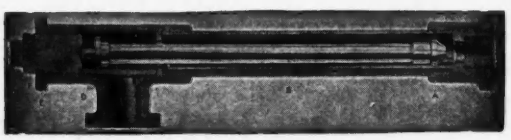

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